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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,592	12/23/2003	Robert Brule	45283.102	1591

22828 7590 03/09/2006

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EXAMINER

BALDWIN, GORDON

ART UNIT PAPER NUMBER

1775

DATE MAILED: 03/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/707,592

Applicant(s)

BRULE ET AL.

Examiner

Gordon R. Baldwin

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 11-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/12/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-10, are drawn to an article, classified in class 428, subclass 312.2.
- II. Claims 11-23, are drawn to a method of manufacture, classified in class 277, subclass 650.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the article requires the use of fiber, powder, and binder, while the method requires only two components. Furthermore, the article requires the step of firing, which is not required by the method. Also, the article has specific porosity requirements not required by the method. Therefore the article may be made by a materially different process whereby the porosity is not specified, and the article is not fixed. And the method may make a materially different article in which only two of the components are required.

Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Edward Yoo on 2/13/2006 a provisional election was made with traverse to prosecute invention I, claims 1-10. Affirmation of this election must be made by applicant in replying to this Office action. Claims 11-23 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Consider claims 1-10, claim (1) is considered vague and indefinite due to it attempting to claim two different products. The unsintered, pre-fired gas seal with a

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certain porosity and a gas seal in a fired state lacking a substantial amount of binder with higher porosity are considered two products or an intermediate and a final product. Due to claim (1) not distinctly claiming one product or the other, it is considered vague and indefinite. Since claims 2-10 are dependant upon claim 1, they are also considered vague and indefinite.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fan et al. Pub. No. 2004/0104544 A1, and further in view of De Jager, Patent No. 5,439,627.

Consider claim 1, Fan teaches a high temperature gas seal that contains ceramic components and fibers as well as ceramic particles (considered to be ceramic powder) (Para. 0018) and binder (Para. 34). Fan also teaches the adding of a reactive components such as metallic powders containing aluminum or zirconium (Para. 0019) to the corresponding ceramic material, which in most cases decrease the porosity, such is the case with alumina particles. (Para 0021) If alumina felt is loaded with aluminum particles and followed by oxidation to alumina, the porosity can be reduced to less than 40% and can be tailored to arrive at the final porosity between that and the original

porosity or the ceramic felt. A porosity of 15% to 35 % is more preferred. (Para. 0021)
Since Fan only mentioned oxidation and not sintering, the seal is considered unsintered and in a pre-fired state.

However, Fan does not teach that after the fired state, the ceramic seal is to have a higher porosity and be substantially free of binder. De Jager teaches in the manufacture of reinforced compositions using composites and laminates reinforced with long or continuous fibers or filaments with ceramic matrix composites (Col. 1 lines 5-12), the use of binder, which is removed by heating (Col. 6, lines 11-14). Since binder is removed by heating, the binder is considered to be substantially removed once the heating process is begun due to its low melting point of 150 185 degrees (Col. 6 lines 10-14). De Jager also teaches that matrix particle (ceramic structure with fiber and filaments) present between the monofilaments keeps the filaments spaced, and the pre-form or molded structure becomes more and more porous during debinding (time required for binder removal by heat(Col. 6 lines 10-14)). (Col. 6 lines 25-31) By this statement in De Jager, when the ceramic item containing binder, is heated (or fired) the binder will be removed, and with the binder being removed, the fibrous particles in the ceramic matrix will increase in porosity.

It would have been obvious to a person of ordinary skill in the art at the time of invention to combine the high temperature gas seals with adjustable porosity of Fan with De Jager's methods of manufacturing reinforced compositions with binders that increase porosity minimally to be able to design seals with lower porosity through

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combining metal powders with certain binders which can maximize physical strength and density.

Consider claim 2, Fan teaches that the gas seals are to be used in solid oxide fuel cells, and the seals must be able to withstand working temperatures that may exceed 1000 degrees Celsius. (Para. 0003) Working temperatures that can exceed 1000 degrees Celsius are considered to be high temperature for fuel cell uses.

Consider claim 3, Fan teaches a high temperature gas seal that contains ceramic components and fibers as well as ceramic particles (considered to be ceramic powder). (Para. 0018) Fan also teaches the adding of a reactive components such as metallic powders containing aluminum or zirconium. (Para. 0019)

Consider claim 4-6, Fan teaches the conversion of the reactive component to the corresponding ceramic material will, in most cases, result in volume expansion and corresponding decrease in porosity of the seal. In a standard impregnation of alumina felt with alumina particles, the porosity decreases from approximately 85% to 55%. (Para. 0021) However, if alumina felt is loaded with aluminum particles and followed by oxidation to alumina, the porosity can be reduced to less than 40% and can be tailored to arrive at the final porosity between that and the original porosity or the ceramic felt. A porosity of 15% to 35 % is more preferred. (Para. 0021) Therefore, porosity variations from 15% to 85% are considered to be taught by Fan. Due to Fan only mentioning oxidation and not sintering, the seal is considered unsintered and in a pre-fired state.

Consider claim 7, Fan teaches the mixing of ceramics and metal powder in wet techniques including the tape casting process.

Additionally, claim (7) is considered a product-by-process due to it teaching a process by which the product is to be manufactured. Therefore, even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. "The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." (MPEP 2113)

Consider claim 8-10, Fan teaches the conversion of the reactive component to the corresponding ceramic material will, in most cases, results in volume expansion and corresponding decrease in porosity of the seal. In a standard impregnation of alumina felt with alumina particles, the porosity decreases from approximately 85% to 55%. (Para. 0021) However, if alumina felt is loaded with aluminum particles and followed by oxidation to alumina, the porosity can be reduced to less than 40% and can be tailored to arrive at the final porosity between that and the original porosity of the ceramic felt. A porosity of 15% to 35 % is more preferred. (Para. 0021) Therefore, porosity variations from 15% to 85% are considered to be taught by Fan. Due to Fan only mentioning oxidation and not sintering, the seal is considered unsintered and in a pre-fired state.

Additionally, De Jager teaches that matrix particles (ceramic structure with fiber and filaments) present between the monofilaments keep the filaments spaced, and the pre-form or molded structure becomes more and more porous during debinding (time required for binder removal by heat(Col. 6 lines 10-14)). (Col. 6 lines 25-31)

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By this statement in De Jager, when the ceramic item containing binder, is heated (or fired) the binder will be removed, and with the binder being removed, the fibrous particles in the ceramic matrix will increase in porosity.

By the teachings of both Fen and De Jager it is considered obvious to one having ordinary skill in the art at the time of the invention to adjust the aluminum oxidation and the binder burn-off for the intended application of having a fired porosity of between 40% -50%, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).


Conclusion:

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon R. Baldwin whose telephone number is (571)272-5166. The examiner can normally be reached on M-F 7:45-5:15.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GRB


JENNIFER MCNEIL
PRIMARY EXAMINER
3/6/06